FinEst Centre
for Smart Cities

SMART CITY CHALLENGE 2024
Solution idea for the city challenges

Max 3 pages
send to smartcity@taltech.ee by Nov 30, 2025

Solution Idea Title (max 5 words, no acronyms) – Smart City DT for safer cities
Planned pilot project duration – 24 months
Main contact/-s – Anna Valli, anna.valli@mosaicfactor.com, , +34 677 600 963, Mosaic Factor

1. Which urban challenge or problem are you planning to provide a solution to?

- Which city challenge/-s proposed by the cities / counties you are targeting? NB! Please choose one from the list of urban challenges chosen for the Smart City Challenge 2025, i.e. Round 5.

Target challenge: https://finestcentre.eu/challenge-proposal/city-resilience-to-natural-hazards/

City resilience to natural hazards, specifically the inability to know which roads remain open during floods, which undermines emergency response and continuity of vital services. This is one of the Round 5 Smart City Challenge topics and aligns with the FinEst Centre call for scalable pilots in 2025. Porto Alegre experienced an over **5-meter flood in May–June 2024** that affected **46 of 96 neighbourhoods and ~157,000 people**, illustrating the scale of the problem. Pärnu's recurring coastal flooding similarly disrupts intra-city transport and servicesfinestcentre.eu.

2. The solution you are proposing

- What is the solution you are proposing for the challenge above?

We propose a modular **city-scale digital twin** that fuses sensor networks, hydrodynamic and sewer models, traffic and asset layers, and a decision engine to produce:

1. **Real-time flood nowcasts** and short-term forecasts at street level.
2. **Road accessibility scores** (open, risky, closed) updated continuously.
3. **Service continuity planner** that prioritizes routes and resources for hospitals, fire, utilities, and evacuation.
4. **Citizen interface** for alerts, safe-route guidance, and crowdsourced validation.

European Union
European Regional Development Fund
Investing in your future
Republic of Estonia
Ministry of Education and Research
Republic of Estonia
Ministry of Economic Affairs and Communications
FORUM VIRIUM HELSINKI
TAL TECH
Aalto University

- How does it solve the city challenge you target?

By combining **predictive modelling** with live telemetry and route-level analytics, the SCDT converts uncertain flood signals into **actionable, location-specific guidance** for emergency managers and citizens, reducing response delays and preventing unnecessary route failures.

3. Innovation and piloting of your pilot solution.

- What are the best solutions available now that solve the challenge you target? (There are some solutions there for sure) How will your solution be better? What is the innovation in it?

Existing solutions provide either hydrodynamic forecasts, traffic monitoring, or static flood maps. Our innovation is tight coupling of high-resolution hydrodynamics with dynamic traffic/accessibility modelling and a service-aware decision engine, delivering route-level, service-prioritized recommendations rather than separate siloed outputs. We will also integrate community reporting to close sensor gaps and improve model calibration.

- What do the cities need for piloting the proposed solution? How the piloting could work?

Cities need access to historical flood maps, selected sensor feeds (water level, rainfall, tide, traffic), and cooperation from emergency services and utilities.:

1. baseline data collection (months 0–3),
2. DT architecture (months 3-6)
3. Model integration (months 6-9)
4. Closed tests (months 9-12),
5. Preparation of live trials and training (months 12-13)
6. Live trials during seasonal events in 1-2 high-risk district (months 13-18).

- Please provide short information about the capabilities of the research and development proposed team. Your team should have members from TalTech as well for sure. In case you do not have them yet, which skills would you need from TalTech.

The R&D team will include ML engineers, software architects, and data scientists, and a project manager specialised in Mobility european innovation projects. We would be covering numerical modelling, IoT integration, and pilot evaluation design.

We don’t have TalTech experts but may require expertise in urban hydrodynamics (hydrodynamic modellers, GIS and transport engineers).

4. Expected impact of your pilot solution.

- What is the potential impact for city environments, sustainability and citizens?

FinEst Centre
for Smart Cities

City environments: Improved routing reduces secondary damage and enables prioritized protection of critical infrastructure. Sustainability: Smarter routing and targeted interventions reduce unnecessary vehicle detours and emergency resource waste.

Citizens: Faster, clearer alerts and safer evacuation routes increase public safety and trust; target outcomes include 40% fewer unexpected critical route closures and 90% timely alert coverage in pilot districts.

Disclaimer: by submitting this form you will give the FinEst Centre for Smart Cities the right to share this idea with cities and other researchers, companies through FinEst Centre homepage. If this idea is selected, the FinEst Centre for Smart Cities has the right to implement this idea with offering you an active role in conducting the pilot. If this pilot is selected then the financing is an investment by the FinEst Centre for Smart Cities.